Prevalence of plasmid-mediated quinolone resistance determinants in extended-spectrum β-lactamase producing Escherichia coli isolated from patients with nosocomial urinary tract infection in Tehran, Iran

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Abstract

Objective: Resistance to quinolones in *E. coli* clinical isolates has become an emerging challenge, especially in hospitalized patient and health care settings, since the introduction of quinolones for the treatment soma of infections. Plasmid mediated quinolone resistance (PMQR) plays an important role in the development of clinical resistance to quinolone. The aim of this study was to investigate PMQR determinants among extended-spectrum β-lactamases (ESBL)-producing *E. coli* recovered from patients with nosocomial urinary tract infection (UTI). **Methods:** In our study, 150 ESBL-producing *E. coli* collected from 380 patients who met the UTI criteria. Phenotypic identification for ESBL production was confirmed by double disc synergy test and Combined Disc Diffusion test. In vitro susceptibility of ESBL isolates to 15 antimicrobial agents was performed by Kirby-Bauer's Disk diffusion (KBDD) method according to Clinical and Laboratory Standards Institute (CLSI, 2012) guidelines. The prevalence of PMQR determinants among ESBL-producing

E. coli were assessed using PCR method. **Results:** The prevalence of ESBL positive E. coli isolates in nosocomial UTIs was 55.6%. In antibiotic susceptibility test of ESBL-producing E. coli showed that all isolates were resistant to amoxicillin and penicillin and resistance rates to the other of antibiotics varied between 96% and 40%. As expected, the majority of isolates were highly susceptible to amikacin 72.7% and imipenem 88%. The most predominant PMQR genotype was aac(6′)-Ib (74.7%). Among 150 ESBL E. coli isolates, 10 isolates (6.7%) were positive for the qnr gene, including 5 for qnrA, 3 for qnrS and 2 for qnrB. Both oqxA and oqxB were detected in our isolates but their prevalence was low. Coexistence of ESBL and PMQR genes was identified in 107 (71.3%) E. coli isolates. **Conclusion:** The data of our study highlighted that the dissemination PMQR determinants among ESBL-producing *E. coli* recovered from patients with nosocomial UTI is relatively high. Continuous surveillance and introduction of guidelines for use of appropriate antibiotic should be seriously considered in Iran.

Key words: *ESBL, Plasmid-mediated quinolone resistance, Beta lactamase, Escherichia coli, antimicrobial resistance*